



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

Carrier

DATE: November 6, 1991

SUBJECT: Ground-Water Review of the Carrier Air Conditioner NPL
Site Feasibility Study, Collerville, TN

FROM: Lee Thomas, Hydrologist
Ground-Water Technology Support Unit

LA

TO: Beth Brown, Remedial Project Manager
North Superfund Remedial Branch

A review has been conducted of the Carrier Air Conditioner NPL Site Feasibility Study (FS), Collerville, Tennessee as requested in your memorandum to Rutherford B. Hayes. In general, it is understood that the FS will require revisions due to its being submitted prior to the completion of the Remedial Investigation (RI). Once the RI is finalized the FS can be completed. However, this draft version of the FS provides insight into the direction that Carrier is proposing to proceed with remediation. Hopefully, these comments will result in the next draft of the FS being closer to what is required than would otherwise be the situation. For this reason, these comments are offered to help expedite the post RI FS. It should be noted that the FS as presently submitted is inadequate in that it does not present an alternative that is protective of the ground-water resource. Specifically, remediation of the plume in the Memphis Sands in the vicinity of the clay pinch out is not considered.

Ground-Water Remediation

Ground-water remediation is not proposed except through the continued operation of the contaminated municipal water supply well adjacent to the property. If the plume has originated as a result of contaminated water traveling from the spill areas along the top of the clay confining lens to the Memphis Sand, it is expected that the highest concentrations of contamination would be located near to the edge of the clay confining lens. Under the scheme proposed by Carrier the plume would have to move further down gradient to the extraction well/municipal water supply well prior to being captured. If the capture zone of the existing extraction well happened to include the entire plume, it would be adequate; otherwise it would continue downgradient resulting in further degradation of the Memphis Sands. As shown in the attached figure (discussed in detail in the next section) which is a model of the capture zones of the municipal water supply well and the five



10663339

extraction wells, the capture zone of the municipal water supply well is actually somewhat restricted in extent. Such a system is not protective of the Memphis Sand since it will not result in the ground-water clean-up goals being met until the plume moved down to the city water supply well. As far as possible the plume should be remediated in place rather than moved downgradient, allowing the plume to expand significantly before extraction takes place.

Ground-Water Extraction System at Clay Pinch Out

A ground-water extraction system is proposed as part of one alternative to protect the Memphis Sand from continued contamination from the overlying shallow aquifer at the point where the clay confining unit pinches out south of the site. In order to evaluate the effectiveness of the containment system, the parameters for the Memphis Sand in Table 3.1 of the FS along with supplemental information such as direction of ground-water flow from the RI Figure 5-4 were collected for modeling the capture zones for the site. The WHPA code (WHPA 2.0) was used to evaluate the extraction system as shown on the attached Figure. This preliminary modeling indicated that the capture zones of the extraction wells do not converge to form a complete barrier at the pinch out of the clay confining zone. Further, the plume in the Memphis Sand is not completely within the capture zones of the extraction wells. Thus the existing well network should be modified to ensure that the Memphis Sand is protected from additional contamination at the clay pinchout and the extraction wells are capturing the entire plume. It is likely that shallow extraction wells should be placed at the edge of the clay pinch out to accomplish this objective. Since the well network was inadequate the FS did not adequately evaluate ground-water remediation at the site and an alternative that was adequately protective of the ground-water resource was not selected in the FS.

Presence of DNAPLS

Although it cannot be conclusively demonstrated that DNAPLs are present at the site, there appears to be strong evidence that DNAPLs are present in soils and in localized pockets in the surficial aquifer that lies on top of the clay confining zone. This evaluation is based in part on the R.S. Kerr Laboratory publication entitled "Estimating Potential for Occurrence of DNAPL at Superfund Sites." The evaluation is based on several lines of evidence. First, the source of the spill was pure product. Second, the soils at the site are silty loams with relatively high permeabilities of 0.63 to 2 inches per hour based on soil types found in the area in the USDA Soil Survey for Shelby County, Tennessee. Although the site was hosed down after the spill resulting in dilution of the pure product, some time probably elapsed prior to the beginning of the hosing. Third,

concentrations have been found in soil at up to 1,550,000 ug/kg which is a high concentration not to be free phase; considering that this sample also included soil, it is likely that all the liquid in this sample is TCE. Fourth, TCE concentrations in the ground-water samples ranged up to 150,180 ug/l in monitoring well MW-15 which is 15% of the solubility of TCE. In well MW-19 TCE concentrations ranged up to 24,000 ug/l which is over 2% of the solubility of TCE. Concentrations greater than 1% of the free phase are considered likely to indicate the potential for the presence of DNAPLs. The high likelihood of DNAPLs as an ongoing source of contamination to the Memphis Sand from the contaminated soil and the shallow aquifer on top of the clay confining zone indicates that the Memphis Sand must be protected from a long term source of contamination. An alternative consisting of the wells at the toe of the clay pinch out in the Memphis Sand would allow a long term source of contamination to continue but would prevent continued contamination of the Memphis Sands. Unfortunately, such a containment scenario entails pumping ground-water until the DNAPLs are depleted, which may be a very long time. However, the FS rejects even this inadequate alternative. The FS must evaluate alternatives which will result in the Memphis Sand being protected from ongoing contamination. The FS must evaluate containment of the source of contamination prior to impacting the Memphis Sand.

Maximum Contaminant Level Goals and Proposed Maximum Contaminant Levels

Maximum Contaminant Level Goals (MCLGs) are not nonenforceable guidelines as stated in Section 2.1.1 but under 40 CFR 300.430(e)(2)(i)(B) are specifically cited as criteria to be attained by remedial actions except when the MCLGs are set at zero. Similarly, the proposed Maximum Contaminant Levels (MCLs) are not nonenforceable as is also incorrectly stated in this section, but are included in the ROD as ground-water clean-up goals so that when they become final, the ROD will be current and will not require updating.

Summary and Conclusions

The FS as presently written will not result in the major ground-water resource in the area, the Memphis Sand, being protected from additional contamination from the site and will not result in the existing contamination in the Memphis Sand being remediated to the levels required by CERCLA and SARA. As such the FS is currently unacceptable. Since a major revision of the FS is required due to changes made in the draft RI after the FS was submitted, the inclusion of remedial alternatives for evaluation and the selection of an alternative that is protective of ground-water should not result in any additional delay at this site. The revised FS should result in the selection of an alternative that is consistent with

the requirements of CERCLA and SARA.

Hopefully these comments will be useful in the evaluation of this FS. If there is additional information that is needed of we may be of additional assistance in any way, please contact me at x3866.

